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ABSTRACT

The Western Institute for Science and Technology, operating since 1968, has had as its objective taking certain of the most promising of the techniques emerging from educational research, combining them, and testing their validity by implementing them in selected school situations. Vanguard, the instructional model which has emerged from this reality testing, effectively coordinates three proven techniques within a highly structured context. First, Vanguard stresses individual diagnosis and continuous progress learning based on demonstrated mastery. Second, Vanguard makes systematic use of incentives. Third, student tutors are used as an integral part of the in-school instructional function, in contrast to more common remedial tutorial programs. Although Vanguard methods have been applied at all levels ranging from preschool to college, and with student populations from disadvantaged to affluent, the focus of this paper is on preschool efforts. To date, a total of six projects have been carried out in three different locations designed for extremely disadvantaged preschool populations. The reading readiness programs at the Marlin Neighborhood Center, Marlin, Texas, provide a good example. In November 1971, 29 five year old children were enrolled in a demonstration project. The specific behavioral goal was to raise their scores on the Metropolitan Reading Readiness Test. This goal was abundantly realized. (Author/JM)

TUTORS IN THE VANGUARD SYSTEM

Introduction

Efforts to improve the quality of education offered in the public schools are widespread, prompted by parental and societal concern for the future of our children. These efforts and concerns, at a time of catastrophically rising costs, point to the impending crisis that now looms over American public education.

Solutions to this crisis do exist today--solutions provided by extensive educational research. These solutions have not been widely implemented because of costs, training, and, especially, lack of viable models. The Western Institute for Science and Technology, WIST, operating since 1968, has had as its objective taking certain of the most promising of the techniques emerging from educational research, combining them, and testing their validity by implementing them in selected school situations.

Vanguard, the instructional model which has emerged from this reality testing, effectively coordinates three proven techniques within a highly structured context. First, Vanguard stresses individual diagnosis and continuous progress learning based on demonstrated mastery. Second, Vanguard makes systematic use of incentives. Third, student tutors are used as an integral part of the in-school instructional function, in contrast to more common remedial tutorial programs.

Although Vanguard methods have been applied at all levels ranging from preschool to college and with student populations from disadvantaged to affluent, the focus of this paper will be on WIST's preschool efforts. To date, WIST has carried out a total of six projects in three different locations designed for extremely disadvantaged preschool populations. The

reading readiness programs at the Marlin Neighborhood Center, Marlin, Texas provide a good example.

Marlin Neighborhood Center

Marlin, Texas is one of the most impoverished rural areas in the United States. An illustrative statistic: 61 percent of the town's public school children qualify under the free lunch program. In November, 1971, twenty-nine 5 year old children were enrolled in a demonstration project. Most of these children were black and had had no previous exposure to any organized educational experience. All of the children came from families whose yearly income was less than $3,000.

WIST's general objective in working with these children was to improve their chances of success in first grade. The specific behavioral goal was to raise their scores on the Metropolitan Reading Readiness Test. This goal was abundantly realized: mean percentile scores on alternate forms of this test jumped from 7.56 to 44.28 in only six months. Judging by the earlier experience of Marlin children from similar backgrounds and on the basis of the test scores, the director of testing for the Marlin schools declared that without the Vanguard program all of these children would have been placed in low ability classes.

Facilities

Two separate but adjacent classrooms on the Marlin Neighborhood Center campus were used for the demonstration. One classroom was designated as the task area, and the other as the recreation or reinforcement area. Tables and chairs were loaned to the program by the Marlin public schools.

Spending Points: The RE Area

The student could enter the RE area upon giving up a specified number of points that had been earned for successful completion of academic work in

the task area. (In the very early phase of the program, task area assignments were nominal and the student could complete them successfully almost immediately.) Once in the RE area he could choose among a variety of reinforcing activities such as drawing on butcher paper, sewing scrap materials, working with clay, painting on cardboard boxes, and playing learning games. Each of the activities available that day had been carefully prepared by the four tutors assigned to the RE area. These tutors explained the available activities to the entering children. Participation in these pleasurable activities required that the child again sacrifice a set number of earned points in order to "pay" for the requisite materials.

As the activity proceeded, tutors were quick to reinforce good behavior by awarding points to the child according to a predetermined scale. Listening to explanations, proper use of materials, lining up quietly for games, and like behaviors were immediately rewarded. At the conclusion of the day's RE activity, the students, assisted by the tutors, cleaned up the area and, again, were reinforced for doing so. Once this job had been completed satisfactorily, the tutors returned the students to their regular day care classes.

Points used in this process were registered by punching holes in a card inscribed with columns for points spent and points earned. The "Earn/Spend" card was retained by the student during the one and a half hours per day that he spent in the Vanguard center. The use and purpose of this token economy system will be clarified in the following section. A sample card is illustrated at the end of this paper.

Token Economy points and the Vanguard Contingency System

It is crucial to the success of the system that the activities in the RE area be reinforcing to the student. If he enjoys participating in these games and rewards, he will naturally want to repeat his participation, thus

setting up a positive system of contingencies. According to the Premack principle, any low-probability activity can be reinforced by any higher-probability activity. The Vanguard student is thus willing to perform assigned academic tasks (low probability) in order to earn points so that he can then return to the RE activities (high probability). The use of punch cards provides a means by which the need for gratification can be satisfied immediately.

It is absolutely essential, then, that the student like what he does in "RE". Stated another way, the student must continue to place a value on obtaining points.

Earning Points: The Task Area

Although it has been indicated that the student could earn some points for exhibiting desirable social behavior, he earned most of them by successfully completing academic work in the task area. Upon entering this room, he proceeded directly to one of the twenty-five learning stations, sat down and waited to be assigned a task by one of the four task area tutors. Just as in the RE area, desirable social behavior of this sort was strongly reinforced.

Each child was a member of a group of from four to ten students whose work was supervised each day by the same tutor. The tutor, referring to the student's record folder, would give him a prescription, or short assignment, for the day. The process by which a tutor decided on a prescription is explained in a later section.

The child began work immediately, encouraged to do so by knowing that such action, by itself, would earn him some points. Materials were filed in skill boxes that were organized simply enough for the student to find the exercise pages he had been assigned. Upon completion of his prescription,

the student took his work to his tutor's desk or checking station and had his work evaluated. If he had achieved a predetermined mastery criterion score, the tutor reinforced him by awarding a substantial number of points or punches according to a predetermined scale. As soon as he had received his points, the student could leave for the RE area.

If the student had failed to achieve the criterion score, the tutor asked him to return to his learning station and repeat his exercise. The tutor had to take care not to prompt or punish the student when checking his work. He was advised not to look at the child while reading it, and to give no clue as to correctness until the student had committed himself on any oral work. Repeated failure at an assigned task would result in the student being assigned alternate materials covering the same content or being tutored individually.

Students entered the Marlin Vanguard program with almost uniformly poor preparation for reading. Their study behavior and social behavior were sporadic, hasty, and error-filled at first, despite the system of incentive rewards. The Vanguard strategy with such students is to reward successively closer approximations toward desired behavior. As the student gained exposure and proficiency with academic materials, closer and closer approximations were reinforced until the child eventually behaved as desired.

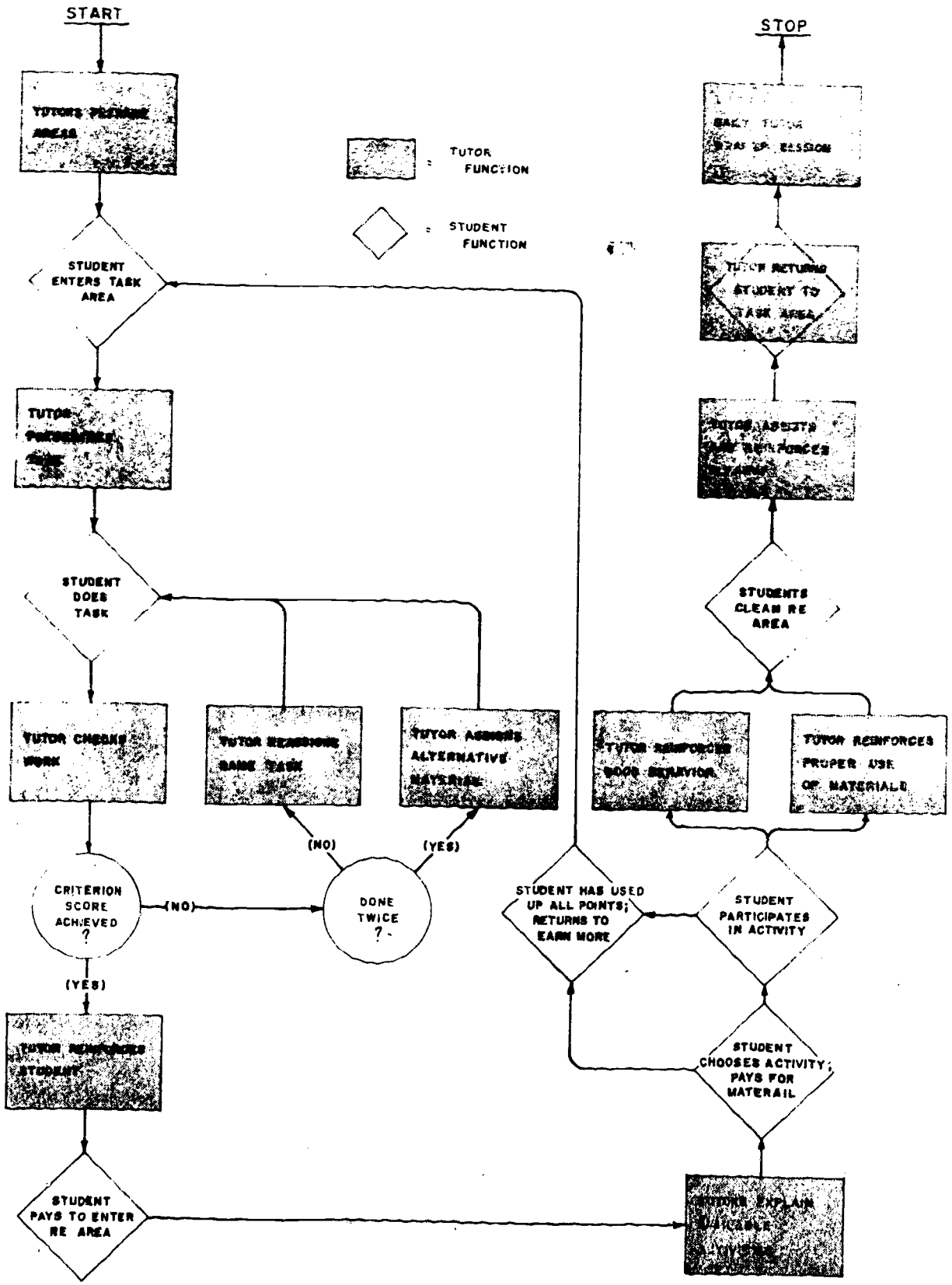
Once all students had left the study area, instructional tutors would leave as well in order to assist in the RE area.

Upon conclusion of the day's activities, all tutors would meet for a daily wrap-up session at which prescriptions for the next day would be determined. Special problems and proposed remedies were discussed. Supervising teachers, senior tutors, and WIST consultants met with the tutors at the daily wrap-up sessions and monitored any decisions made.

The following instructional flow chart will help to clarify the Marlin Vanguard system for the reader:

FLOW CHART NO. 1

VANGUARD DAILY INSTRUCTIONAL PROCESS



It can be seen from this overview of the Marlin instructional process that the role of the tutor was a highly sophisticated and responsible one. First, the tutor served as initial instructional agent rather than providing remediation as in so many other tutoring systems. In Marlin he was responsible for directing the child's first steps in learning to read. Second, he had to decide on prescriptions, assign them to students, and assess work done. Third, he must understand and carry out a complicated system of contingency management while avoiding the pitfalls of punishing or prompting. Preparation for such a task required careful training.[1]

Tutor Training: The Program

The tutors in the Marlin Vanguard program were eighth grade volunteers from an adjacent junior high school. They worked for an hour and a half daily, giving up a study hall and part of their lunch period. Training sessions utilized this time slot for a period of two weeks. Training was conducted by two members of the WIST staff and had as its objective the development of the following tutor capabilities:

Arranging of task area and materials;
Arranging of RE area and materials;
Prescribing academic work;
Checking student work;
Using punch cards to:
   Reinforce successive goal approximations,
   Reinforce good behavior,
   Register points earned and spent;
Avoiding prompting;
Avoiding punishing;
Assessing student needs in wrap-up sessions;
Creating wall charts to record student progress; and
Maintaining daily written log of activities.

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[1]Many of the tutor training techniques employed by WIST were developed as a result of observing a demonstration conducted by Dr. Grant Von Harrison when he visited Waco on January 30, 1970. WIST has also benefited greatly from examining Dr. Von Harrison's written presentations.

Training consisted of a series of discrete task assignments, immediate validation of results, and heavy reinforcement of effective task completion and good behavior. Techniques employed included role playing, inventing games, playing games, demonstration of teaching materials and equipment, and repeated practice at solving hypothetical problems.

Each tutor understood clearly that the better the job he did, the more rewards he would earn. His points, too, were tallied on an "Earn/Spend" card, but rewards were deferred to special events such as ice cream parties, trips, or shopping expeditions.

Tutor Training: Prescriptions

To those unfamiliar with the Vanguard program, the problem of teaching twelve year olds to design prescriptions may seem both overwhelming and quite a gamble. Such a surmise is unfounded, however.

The Marlin Vanguard project used two principal sets of instructional materials. They were the WIST programmed reading materials which consist of a manual and cassette tapes, and the Southwest Regional Lab's (SWRL) reading program. In each case the tutor followed a predetermined sequence of steps in deciding on a prescription for a particular student. Each of these sentences is described below, accompanied by a flow chart.

The WIST Reading Program

The entering student's score on a set of diagnostic tests was used to determine the level at which he would begin the WIST program. Once introduced to and working within the WIST program, student needs and resultant prescriptions were determined by reference to a wall chart which stated exactly how many pages of the manual a student should attempt for the next unit of work. If a student had reached criterion on his assignment of, say,

pages 69 and 70, he would be given pages 71 and 72 as his prescription for the next day. In the case of extremely fast or slow students, tutors had discretion to increase or decrease the number of pages assigned. Such departures from programmed prescriptions were permitted only if the tutor had checked with the teacher or WIST consultant in a wrap-up session.

The SWRL Reading Program

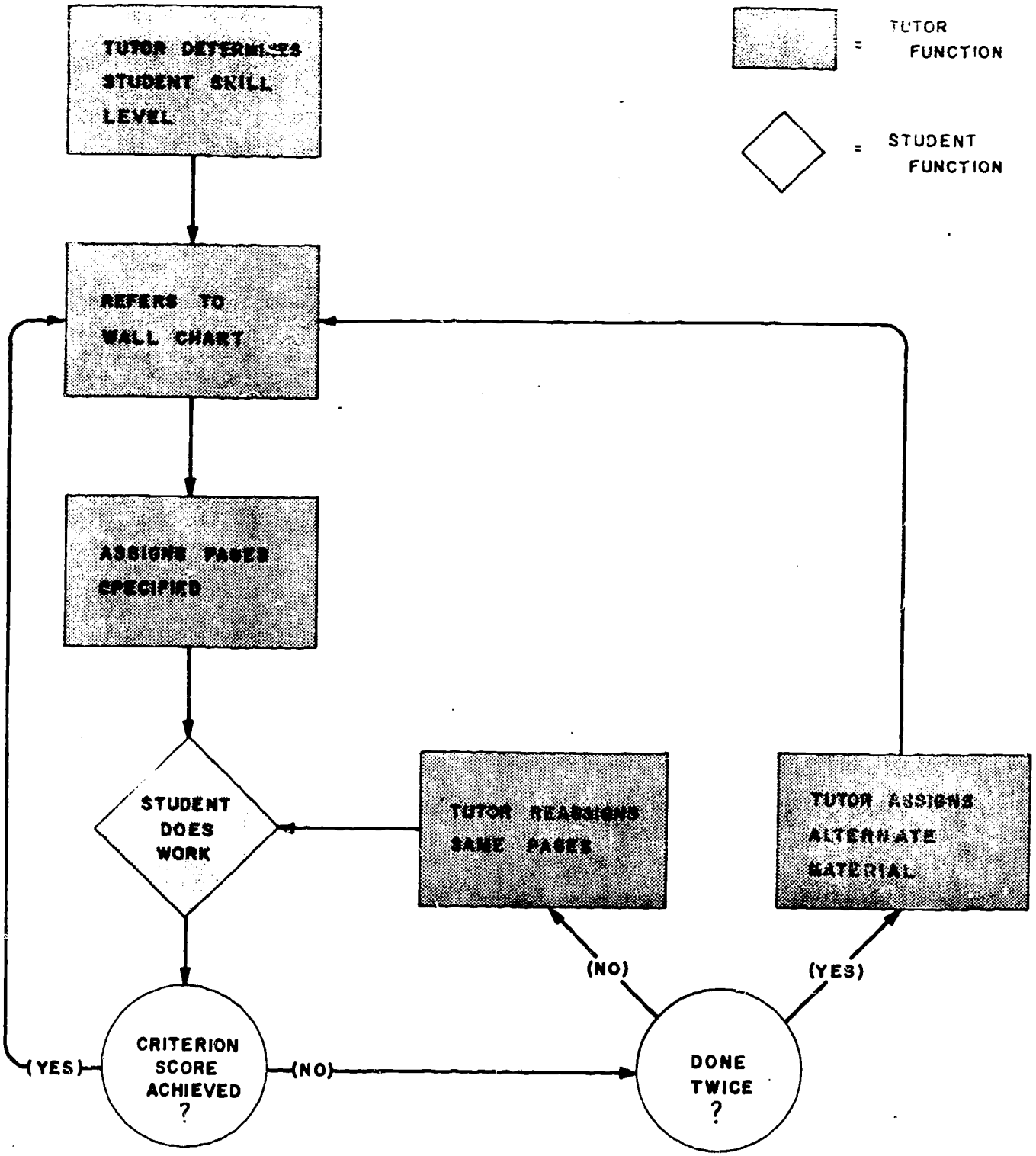
The SWRL program is a group instructional process and was used less often than the WIST program. Decisions to use SWRL or WIST were made in wrap-up consultation sessions. Once SWRL had been decided upon, a group of about four students would receive instruction according to directions contained in the SWRL kit. At the end of a unit of work, the children would take a posttest. If all the kids achieved a criterion score, the next unit was begun. If all the kids had failed to achieve criterion, the unit was repeated. If some passed and some failed, those passing received "enrichment" instruction and those failing got "second" instruction. After this phase was completed for both groups, they regrouped and instruction in the next unit commenced.

Tutor Training: Conclusions

The Vanguard system's objective in training tutors was not to provide specific written responses for every conceivable contingency, problem, or student response that might arise in the course of tutoring. Instead, we taught the tutors a repertoire of teaching behaviors and gave them a highly structured context in which to apply them. Although tutors were the prime instructional agents, they were closely supervised. Hence their discretion, though real, was limited. Put another way, the process of tutoring was quite controlled, but the outcome behaviors that were generated were quite open-ended. By open-ended we mean that students were helped to make very rapid

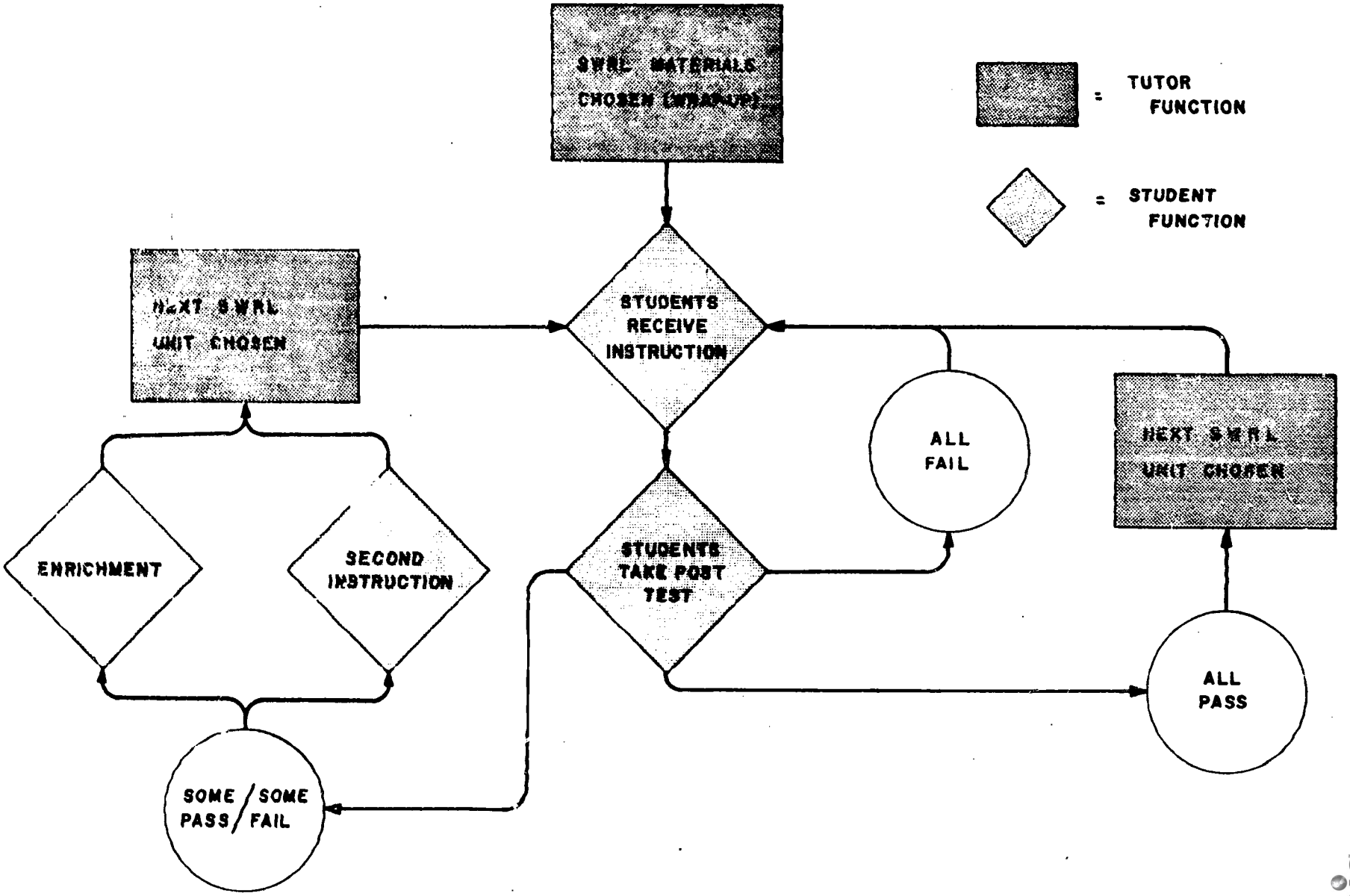
FLOW CHART NO. 2

PRESCRIPTION of WIST READING PROGRAM



FLOW CHART NO. 3

PRESCRIPTION of SWRL READING PROGRAM



demic and social gains. Tutors in the RE areas worked under the same contingencies and were likewise controlled in process but not in how much student enthusiasm and creativity they could promote. In both areas the student was the beneficiary of a system which was teaching the problem-solving process.

Tutors were also heavily reinforced for using their imagination to invent learning games and academic activities. Such ideas were always evaluated by consultants and then tested before being put to general use. These prescriptions were often not "academic", but directed the student to activities that imparted readiness skills necessary for success in the classroom. Students were assigned manipulative materials, motor skill exercises, and games which gave him a chance to learn new skills or apply those already learned.

Vanguard's success in freeing the student tutor's intelligence and judgment is illustrated by the following comment. After a visit by outside observers who could not refrain from interacting with the children, one tutor complained to the WIST consultant present. "Please don't let any more adults visit the center!" she urged. "They keep reinforcing inappropriate behaviors!" The consultant had to admit that she was right!

Satiation, Control, and Sampling Incentives

Preventing satiation, or boredom with reward incentives, was an imperative in the Marlin Vanguard project. When recreation points seemed to lose their value for a particular child, the staff attempted to discover the reason immediately. Sometimes the child had ceased to participate in an activity that remained popular with the rest of the students. If this was the case, the Vanguard system had a built in response: there were always many rewards to choose from.

Sometimes it was advisable to raise the "price" of an activity that was being used excessively, thereby encouraging students to sample other materials as well as helping to insure that the high-use activity retained its reward value. It sometimes developed that the bulk of the children had so many points they couldn't spend them all and the opportunity to gain more points motivated them to complete their prescriptions and tests. Such a situation was sometimes caused by points being too easy to earn; a solution was to reduce the number of points (but not the frequency) given as rewards.

Another solution was to "retire" items from the reaction "menu" for a stated length of time. Some Vanguard centers have set up a regular rotation of their most popular incentives. Pool, for instance, may be available for a week, then taken off the menu to be replaced in turn by ping-pong and shuffleboard, before being reactivated two weeks later. A final method of encouraging students to value points and thus strive to earn them is the special event or "Big Deal." Treats such as trips to the zoo, a special party, or a cookout all elicit great interest from students and also require that they sacrifice a great number of points. Students learn to save and value points and also to realize that it may be worthwhile at times to delay satisfaction of wishes.

Such strategies not only help to avoid satiation, they encourage the student to sample, and come to like, activities that he would not have tried if he were completely free to follow his own inclinations. The student thus begins a transition leading from external reward motivation to a self-generated interest in new activities. This transition will, it is hoped, eventually lead to a self-sustaining interest in academic subjects. The students will eventually find the intrinsic incentive of success in school even more of a spur than tangible rewards. One measure of the effectiveness of the graduated and

individually differentiated Vanguard approach was that students gradually increased their stay in the task area from one-third of their time to two-thirds of their time.

Results

The principal objective of the Marlin Vanguard project was clearly realized, as the gain in mean percentile scores on the Metropolitan test suggests. There were several other results that deserve comment.

Students

First, the children involved as students have sustained the gains made during the course of instruction. Teachers in the kindergarten and first grade of the Marlin schools report that Vanguard "graduates" are performing well, with several ranking among the better students in the class. These students seem to have avoided the pattern of failure that almost certainly would have befallen them had they not experienced the Vanguard program.

Teachers

Second, Vanguard pre-school programs can help to relieve the burden on elementary school teachers who are no longer forced to cope with classes comprised of students who, lacking basic skills, are unable to compete with peers. Special education classes designed for the truly handicapped are not swamped by a tide of students who do not really belong there.

Tutors

The effect on tutors is equally important. While hard data is not available for tutors to the extent that it is for pupils, what there is suggests a pattern of real accomplishment. Each of the tutors was tested with the California Test of Personality before and after his involvement. While the posttest scores do not reflect any dramatic change in the junior tutors, their

school principal, the Marlin testing director, and the WIST consultants all remarked an increase in self-confidence and quality of work. Perhaps more important, tutors were tremendously excited by their involvement and communicated this to their peers. The withdrawal of one tutor occasioned a flood of requests to replace her.

The implications of this student interest and excitement about the learning experience are enormous. Tutors learn a great deal about the necessity for precision, judgment, and reliability. They learn to accept responsibility in a way that is meaningful and productive. An even more important advantage will accrue in the long run if any significant number of children can participate in a program like Vanguard. The Plowden Study in England and the Equal Educational Opportunity Study in this country suggest that by far the major determinant of student achievement is parental attitude and interest. If a child has spent a great deal of time in his elementary school years as a tutor assisting other children and taking a direct part in the instructional program, it is probable that he will be vitally interested in the education of his own children upon becoming a parent.

Review of the Vanguard Model

A visitor to a Vanguard program can always ask a teacher or tutor, "What skills has Johnny mastered and on which ones is he now concentrating?" and be given a precise answer. To be able to answer such a question definitively suggests that an instructional program can determine the skills a student lacks and can insure that the student is working on exercises which teach them. The question is, in fact, a definition of individualized instruction.

Instead of depending on extraordinary efforts by an individual teacher to keep abreast of student needs and progress, the Vanguard approach is systematic, accurate, and utilizes the eagerness and real ability of students.

Further, the Vanguard system has been shown to be replicable. In other words, excellent instruction can be exported. Teachers and tutors can be trained to handle the specific techniques in the relatively short period of several weeks.

The developers of Vanguard are confident that when fully implemented, their system can deliver quality education. Vanguard enables the vast majority of students to achieve academic mastery and to acquire significant affective gains--all at an operating cost less than the current Texas statewide per pupil expenditure.